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THE MULTICHANNEL OCEAN COLOR SENSOR (MOCS)

by

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The MOCS is an imaging spectroradiometer with a sensitivity that matches the light upwelling from open bodies of water. Twenty contiguous spectral channels in the visible are recorded in a line scanning mode from an aircraft. The system also supports a thermal infrared radiometer and will accept input from a position location system.

The sensor in the MOCS system is an image dissector tube. A line from the scene below the aircraft is disbursed onto the face of the image dissector through a grating. This is recorded as a 150 pixel line with 20 spectral channels in each pixel, where the spatial extent is 2 by 4 mrad, and the spectral width of each channel is about 15 nm. Three scans (or lines) are recorded each second; thus, unless the aircraft is quite high, the scene below is sampled rather than recorded as a complete image. For most ocean color missions, this is a reasonable method of collecting data.

Originally at the NASA Langley Research Center, the spectral curvature algorithm was developed during this time. This relates the irradiance in Channel 7 of the MOCS normalized by the channels on either side to the chlorophyll concentration in the water. Channel 7 is centered at 490 nm which is at a chlorophyll absorption peak. No atmospheric correction to the data is needed

for low flying aircraft gathering chlorophyll data using this algorithm.

Although the MOCS is now about 15 years old, because its response has been so stable, we decided to upgrade its data recording system from an obsolete computer with a restricted data record. We chose to duplicate the system used by the Aircraft Oceanographic Lidar where possible. The new MOCS system was designed, and while most of the parts were acquired, the cost of the total system was more than the available funds. To complete the instrument in order to demonstrate the new system, the missing pieces were borrowed from other projects. This was flown on several BIOWATT II missions in 1987 on which data were collected, and the system was shown to work. Earlier, the older data recording system was used in a mission to support the National Science Foundation funded Microbial Exchanges and Coupling in Coastal Atlantic Systems project at the mouth of the Chesapeake Bay. A report of this mission is in preparation.

There have been no funds to finish the data recording system; however, a proposal to NASA Headquarters for the necessary funds will be submitted.

The MOCS has been a reliable instrument for recording ocean color from low flying aircraft. As NASA enters the next period of ocean color investigations from space, such a device can play an important role in calibration of the space instrument, as well as provide support for programs developing the next generation of space borne devices.